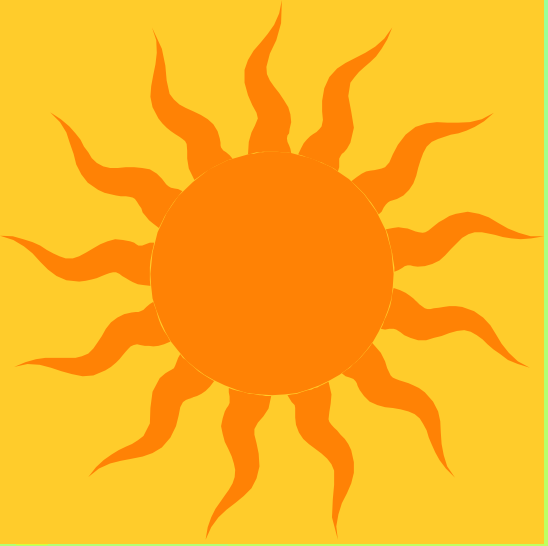
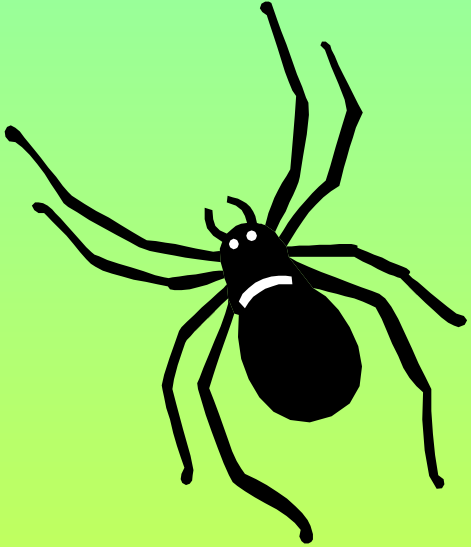




Environmental Emergencies

Overview

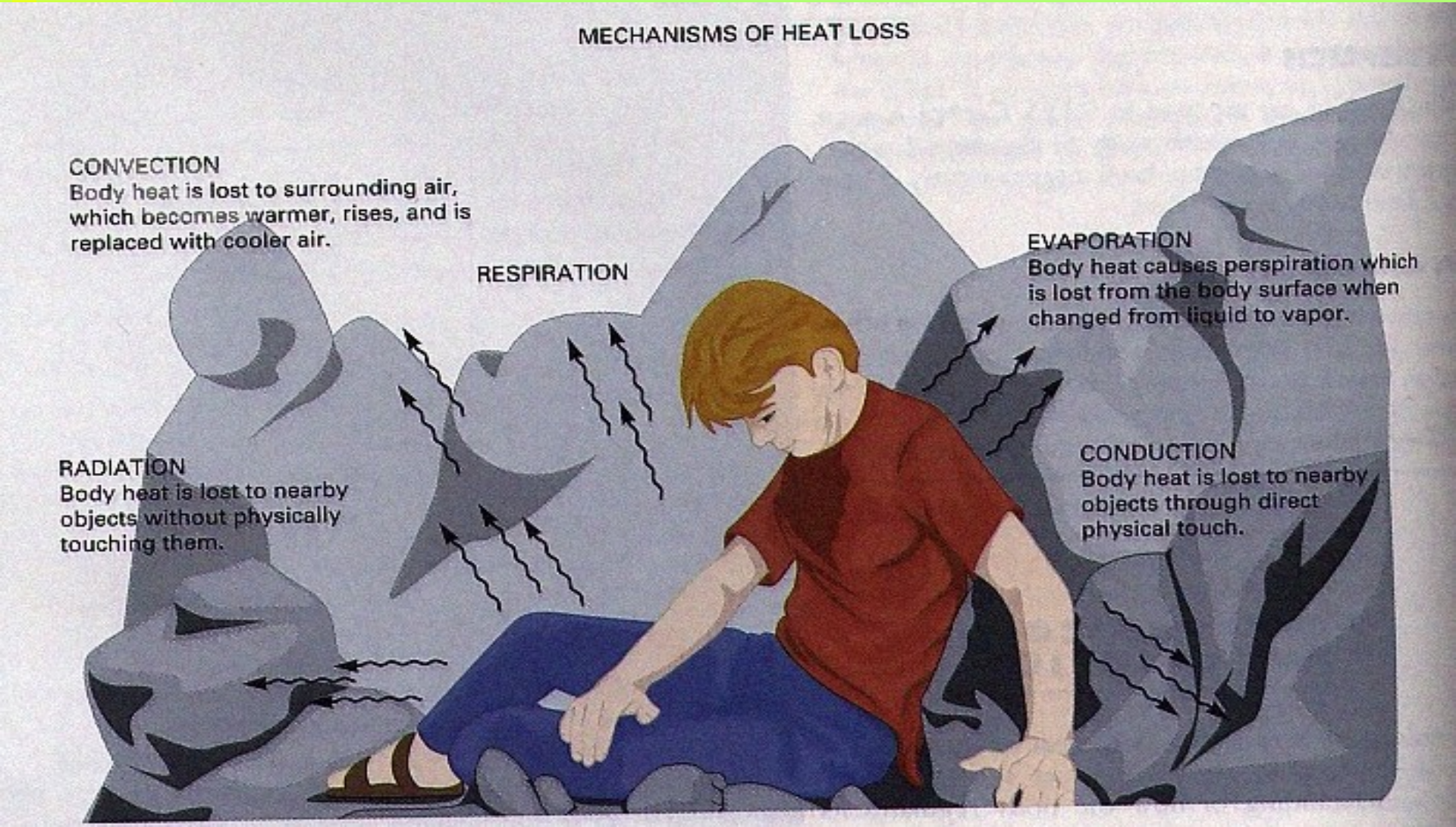
- **Temperature Regulation**
- **Important Questions to Ask**
- **Exposure to Cold**
- **Exposure to Heat**
- **Water-Related Emergencies**
- **Bites & Stings**

Temperature Regulation

- **Heat loss exceeds heat gained - hypothermia (low body temperature)**

Temperature Regulation

Heat loss occurs by


MECHANISMS OF HEAT LOSS
CONVECTION
Body heat is lost to surrounding air, which becomes warmer, rises, and is replaced with cooler air.
RESPIRATION
EVAPORATION
Body heat causes perspiration which is lost from the body surface when changed from liquid to vapor.
RADIATION
Body heat is lost to nearby objects without physically touching them.
CONDUCTION
Body heat is lost to nearby objects through direct physical touch.

Temperature Regulation

- **EMT-B must be aware of methods of heat loss when treating patients with hypothermia to prevent further heat loss**

Temperature Regulation

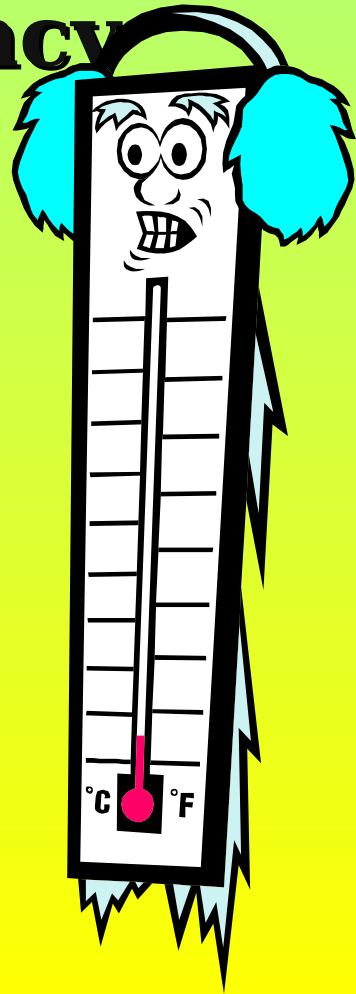
- **Heat gained exceeds heat loss - hyperthermia (high body core temperature)**

Important Questions

- **Source**
- **Environment**
- **Loss of consciousness**
- **Effects**
  - **General**
  - **Local**
- **Duration**

Exposure to Cold

- **Generalized cold emergency**
  - **Predisposing factors**
    - **Cold environment**
      - **Immersion**
      - **Non-immersion**



Generalized cold emergency

- **Predisposing factors**
  - **Age**
    - **Very old**
    - **Very young**
      - **Infants & young children are small with large surface area**
      - **Small muscle mass, so shivering is poor in children & not at all in infants**
      - **Less body fat**
      - **Younger children need help to protect self. Cannot put on or take off clothes**

Generalized cold emergency

- **Predisposing factors**
  - **Medical conditions**
    - **Shock**
    - **Head injury**
    - **Burns**
    - **Generalized infection**
    - **Injuries to the spinal cord**
    - **Diabetes & hypoglycemia**
  - **Drugs/poisons**

Generalized cold emergency

- **S & S of generalized hypothermia**
  - **Environmental conditions of cold exposure**
    - **Obvious exposure**
    - **Subtle exposure**
      - **Ethanol ingestion**
      - **Underlying illness**
      - **Overdose/poisoning**
      - **Major trauma**
      - **outdoor resuscitation**
      - **Ambient temperature decreased**

Generalized cold emergency

- **S & S of generalized hypothermia**
  - **Cool/cold skin temperature - the EMT-B should:**
    - **Place the back of his hand between the clothing and the patient's abdomen to assess the general temperature of the patient**
    - **The patient experiencing a generalized cold emergency will present with cool abdominal skin temperature**

Generalized cold emergency

- **S & S of generalized hypothermia**
  - **Decreasing mental status or motor function - correlates with the degree of hypothermia**
    - **Poor coordination**
    - **Memory disturbances**
    - **Reduction or loss of sensation-to touch**
    - **Mood changes**
    - **Less communicative**
    - **Dizziness**
    - **Speech difficulty**

Generalized cold emergency

- **S & S of generalized hypothermia**
  - **Stiff or rigid posture**
  - **Muscular rigidity**
  - **Shivering may be present or absent**
  - **Breathing variations**
    - **Early - rapid breathing**
    - **Late - shallow, slow, or even absent breathing**

Generalized cold emergency

- **S & S of generalized hypothermia**
  - **Slowly responding pupils**
  - **Pulse**
    - **Early - rapid**
    - **Late - slow & barely palpable and/or irregular, or completely absent**
  - **Low to absent blood pressure**
  - **Poor judgment - the patient may actually remove clothing**

Generalized cold emergency

- **S & S of generalized hypothermia**
  - **Complaints of joint/muscle stiffness**
  - **Skin**
    - **Red - early**
    - **Pale**
    - **Cyanotic - blue - gray**
    - **Stiff/hard**

Generalized cold emergency

- **Emergency medical care for hypothermia**
  - **Remove patient from the environment - protect the patient from further heat loss**
  - **remove wet clothing and cover with blanket**
  - **Handle patient extremely gently**
  - **Do not allow the patient to walk or exert himself**

Generalized cold emergency

- **Emergency medical care for hypothermia**
  - **Administer oxygen - oxygen should be warmed and humidified**
  - **Assess pulses for 30-45 seconds before starting CPR**

Generalized cold emergency

- **Emergency medical care for hypothermia**
  - **If the patient is alert & responding appropriately, actively rewarm**
    - **Warm blankets**
    - **Heat packs or hot water bottles to the groin, axillary and cervical regions**
    - **Turn the heat up high in the patient compartment of the ambulance**

Generalized cold emergency

- **Emergency medical care for hypothermia**
  - **If the patient is unresponsive or not responding appropriately, rewarm passively**
    - **Warm blankets**
    - **Turn the heat up high in the patient compartment of the ambulance**

Generalized cold emergency

- **Emergency medical care for hypothermia**
  - **Do not allow the patient to eat or drink stimulants**
  - **Do not massage extremities**

Local cold injuries

- **Localized to specific area of body**
  - **Predisposing factors**
  - **Tend to occur on the extremities and exposed ears, nose, and face**

Local cold injuries

- **S & S**
  - **Local injury with clear demarcation**
  - **Early or superficial injury**
    - **blanching of the skin - palpation of the skin in which normal color does not return**
    - **Loss of feeling & sensation in injured area**
    - **Skin remains soft**
    - **If rewarmed, tingling sensation**

Local cold injuries

- **S & S**
  - Late or deep injury
    - White, waxy skin
    - Firm to frozen feeling upon palpation
    - Swelling may be present
    - Blisters may be present
    - If thawed or partially thawed, the skin may appear flushed with areas of purple & blanching or mottled and cyanotic

Local cold injuries

- **Emergency medical Care**
  - **Remove the patient from the environment**
  - **Protect the cold-injured extremity from further injury**
  - **Administer oxygen**
  - **Remove wet or restrictive clothing**

Local cold injuries

- **Emergency medical Care**
  - **If early or superficial injury**
    - **Splint extremity**
    - **Cover the extremity**
    - **Do not rub or massage**
    - **Do not re-expose to the cold**

Local cold injuries

- **Emergency medical Care**
  - **If late or deep cold injury**
    - **Remove jewelry**
    - **Cover with dry clothing or dressings**
    - **Do not:**
      - **Break blisters**
      - **Rub or massage area**
      - **Apply heat**
      - **Rewarm**
      - **Allow the patient to walk on the affected extremity**

Local cold injuries

- **When an extremely long or delayed transport is inevitable, then active rapid rewarming should be done**

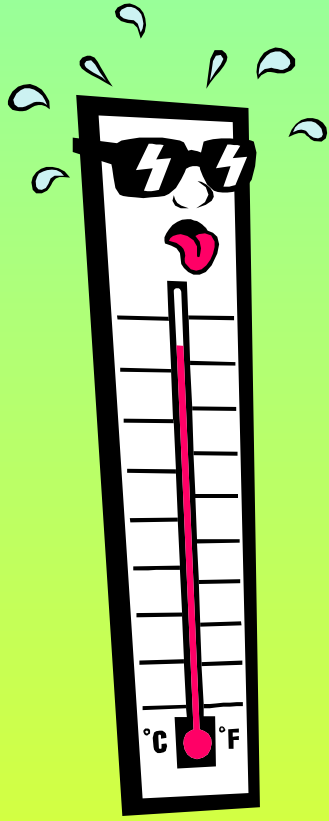
Local cold injuries

- **Immerse the affected part in warm water bath**
- **Monitor the water to ensure it does not cool from the frozen part**
- **Continuously stir water**
- **Continue until the part is soft & color and sensation return**

Local cold injuries

- **Dress the area with dry sterile dressings**
- **If hand or foot, place dry sterile dressings between fingers or toes**
- **Protect against refreezing the warmed part**
- **Expect the patient to complain of severe pain**

Exposure to heat



- **Predisposing factors**
  - **Climate**
    - **High ambient temperature reduces the body's ability to lose heat by radiation**
    - **High relative humidity reduces the body's ability to lose heat through evaporation**

Exposure to heat

- **Predisposing factors**
  - **Exercise & activity**
    - **Can lose more than 1 liter of sweat per hour**
    - **Loss of electrolytes**

Exposure to heat

- **Predisposing factors**
  - **Age**
    - **Elderly**
      - **Poor thermoregulation**
      - **Medications**
      - **Lack mobility - can not escape hot environment**

Exposure to heat

- **Predisposing factors**
  - **Age**
    - **Newborn/infants**
      - **Poor thermoregulation**
      - **Cannot remove own clothing**

Exposure to heat

- **Predisposing factors**
  - **Pre-existing illness and/or conditions**
    - **Heart disease**
    - **Dehydration**
    - **Obesity**
    - **Fever**
    - **Fatigue**
    - **Diabetes**
  - **Drugs/medications**

Exposure to heat

- **S&S**
  - **Muscular cramps**
  - **Weakness or exhaustion**
  - **Dizziness or faintness**
  - **Skin**
    - **Moist, pale, normal to cool temperature**
    - **Hot, dry or moist - dire emergency**
  - **Rapid heart rate**
  - **Altered mental status to unresponsive**

Exposure to heat

- **Emergency medical care - patient with moist, pale, normal-to-cool skin temperature**
  - **Remove patient from the hot environment and place in a cool environment**
  - **Administer oxygen if not already done during the initial assessment**

Exposure to heat

- **Emergency medical care**
  - **Apply cool packs to neck, groin, & armpits**
  - **Keep the skin wet by applying water with a sponge or wet towels**
  - **Fan aggressively**
  - **Transport immediately**

Water-Related Emergencies

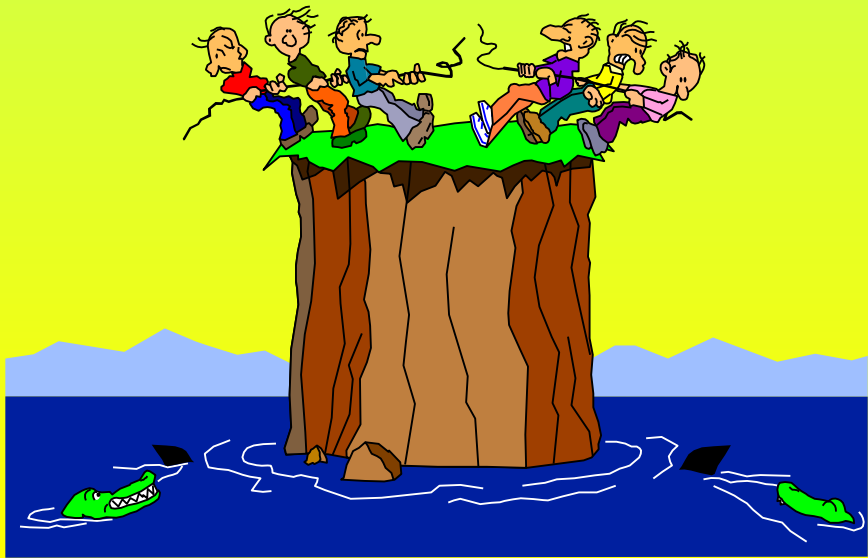
- **Near-drowning/drowning**
  - **Ensure the safety of the rescue personnel**
  - **Suspect possible spine injury if a diving accident is involved or cause of the incident is unknown**
  - **Consider length of time is cold-water drowning - Any pulseless, nonbreathing patient who has been submerged in cold water should be resuscitated**

Water-Related Emergencies

- **Emergency medical care**
  - **Use in-line immobilization & remove from water with backboard if spine injury is suspected and patient is responsive**
  - **If there is no suspected spine injury, place patient on left side to allow water, vomitus, & secretions to drain from upper airway**

Water-Related Emergencies

- **Emergency medical care**
  - **Suction as needed**
  - **Administer oxygen if not already done during initial assessment**



Water-Related Emergencies

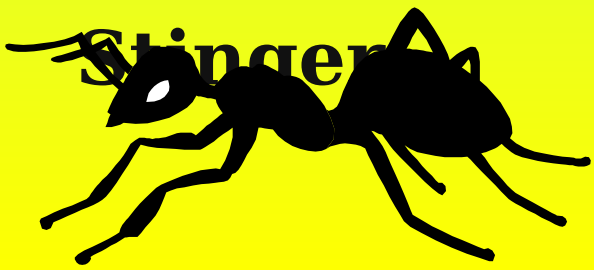
- **If gastric distention interferes with artificial ventilation, the patient should be**
  - **Placed on his left side**
  - **With suction immediately available**
  - **EMT-B should place his hand over the epigastric area of the abdomen & apply firm pressure to relieve the distention**

Water-Related Emergencies

- **Gastric distention**
  - **This procedure should only be done if the gastric distention interferes with the ability of the EMT-B to artificially ventilate the patient effectively**
- **Warm-water drowning requiring resuscitation are discussed during cardiac emergencies**

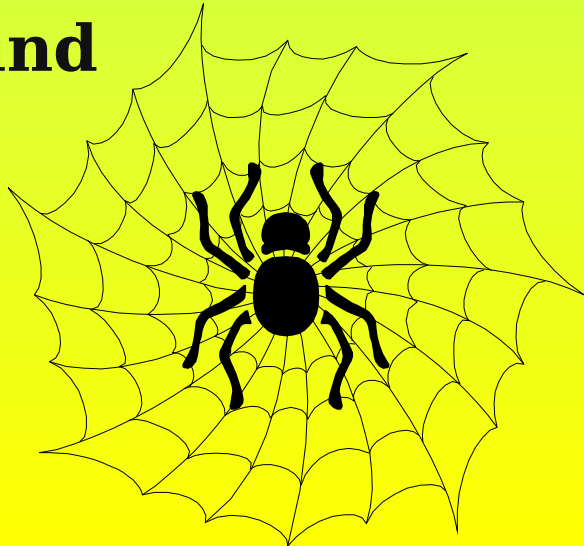
Bites & Stings

- **S&S**
  - **Hx or bite or sting**
  - **Pain**
  - **Redness**
  - **Swelling**
  - **Weakness**
  - **Dizziness**
  - **Chills**
  - **Fever**
  - **Nausea**
  - **Vomiting**
  - **Bite marks**
  - **Stinger**



Bites & Stings

- **Emergency Medical care**
  - **If stinger present - remove it**
    - **Scrape stinger out**
    - **Avoid using tweezers or forceps as these can squeeze venom from the venom sac into the wound**
  - **Wash area gently**



Bites & Stings

- **Emergency Medical care**
  - **Remove jewelry from injured area before swelling begins, if possible**
  - **Place injection site slightly below the level of the patient's heart**

Bites & Stings

- **Emergency Medical care**
  - **Do not apply cold to snake bites**
  - **consult medical direction regarding constricting band for snake bite**
  - **Observe for development of signs & symptoms of an allergic reaction - treat as needed**

Summary

- **Temperature Regulation**
- **Important Questions to Ask**
- **Exposure to Cold**
- **Exposure to Heat**
- **Water-Related Emergencies**
- **Bites & Stings**